

**CLAIMS**

1. Apparatus for the characterisation of pigmented skin lesions, characterised in that it comprises:

- 5     • means designed to acquire images of the lesion, filmed with lighting at different wavelengths;
- means designed to segment and parameterise each of said images;
- means designed to extrapolate a data set from said images;
- means designed to generate a neural network;
- 10    • means designed to process the data relating to a set of known cases and define a threshold value on the basis of said processing;
- means designed to input said data extrapolated from said images into the neural network;
- means designed to compare the results processed by said neural
- 15    network with said threshold value;
- means designed to vary the weighting of each parameter supplied to the neural network on the basis of said results.

2. Apparatus for the characterisation of pigmented skin lesions as claimed in claim 1, characterised in that it comprises:

- 20    • means designed to process images filmed with light at different wavelengths to extract the descriptors of the lesion;
- means designed to reduce the number of said descriptors by factorial analysis in order to select a limited number of variables which retain over 85%, and preferably at least 95% of the variance.

25    3. Apparatus for the characterisation of pigmented skin lesions as claimed in claim 1, characterised in that it comprises means designed to store an archive containing the values of the descriptors relating to all the images stored, and means designed to normalise the values of said descriptors by

means of a function of the following type:

$$i'_n(m) = \frac{i_n(m)}{i_{n,\max} - i_{n,\min}} + \frac{i_{n,\min}}{i_{n,\min} - i_{n,\max}}$$

wherein  $i_{n,\min}$  and  $i_{n,\max}$  are the minimum and maximum value  
5 respectively of each descriptor  $n$ , among all the values of the lesions  
previously acquired.

4. Apparatus for the characterisation of pigmented skin lesions as claimed  
in claim 2, characterised in that said means designed to film images of the  
lesion consist of a video camera associated with an illuminator comprising a  
10 light source and a rotating mirror with diffraction grid and means designed to  
control the rotations of said mirror to vary the wavelength of the light, said  
video camera being fitted with sensors designed to film a black and white  
image which are sensitive to wavelengths of light between 480 and 1000  
nanometers, and sensors designed to film a colour image of the lesion.

15 5. Apparatus for the characterisation of pigmented skin lesions as claimed  
in claims 3 and 4, characterised in that it comprises means designed to obtain  
from said images, for each lesion, at least the dimensions, variegation,  
reflectance in the visible and infra-red light zones, the presence of dark  
patches and the ratio between the area of the dark patches and the rest of the  
20 lesion.

6. Apparatus for the characterisation of pigmented skin lesions as claimed  
in each of the preceding claims, characterised in that it comprises:

- means designed to select a lesion;
- means designed to vary the value of each descriptor by assigning to  
25 it a set of values which fall within a pre-determined interval, the  
values of all the other descriptors being maintained unchanged;
- means designed to input said values into the neural network to  
generate an output value, and means designed to construct a curve

with said output values;

- means designed to display a point on said curve corresponding to the value actually measured by the descriptor represented in said curve; and

5        • means designed to display on a graph the intersections of said curve with a line representing said threshold value.

7.        Apparatus for the characterisation of pigmented skin lesions as claimed in claim 6, characterised in that it comprises means designed to show geometrical parameters, such as the distance between said threshold value and 10 said point and/or the area under the curve in the zone between said threshold and said point, on one of the axes of the graph, and to derive from said measurement a value indicating the influence of a variation in one of the descriptors on the classification of a lesion.